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New data on Gnaphosidae (Arachnida, Araneae) of Iraq

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Abstract

New faunistic data are provided on the ground spiders (Araneae: Gnaphosidae) of Iraq. Three genera (*Haplodrassus* Chamberlin, 1922; *Minosiella* Dalmas, 1921; *Odontodrassus* Jézéquel, 1965) and six species (*Haplodrassus dalmatensis* (L. Koch, 1866); *Minosiella intermedia* Denis, 1958; *Odontodrassus aravaensis* Levy, 1999; *Odontodrassus mundulus* (O. Pickard-Cambridge, 1872); *Pterotricha dalmasi* Fage, 1929; *Zelotes fagei* Denis, 1955) are reported in Iraq for the first time, and the previously unknown female of *Pterotricha kovblyuki* Zamani & Marusik, 2018 is described. In addition, a list of all gnaphosids reported from Iraq (16 spp.) is provided.

Key Words

Faunistics, ground spiders, Middle East, new record, taxonomy

Introduction

Gnaphosidae Banks, 1892, with more than 2400 extant species in 144 genera, is a very large family of spiders occurring worldwide (WSC 2022). Most members of the family are free-living, ground-dwelling spiders typically found on the surface or within crevices (Jocqué and Dippenaar-Schoeman 2006). Despite the rather high diversity of this group in warm and arid regions, it remains very poorly studied in Iraq. No species of Gnaphosidae was known from Iraq until the publication of Fomichev et al. (2018), which described a new species of *Pterotricha* Kulczyński, 1903 and recorded *Nomisia conigera* (Spassky, 1941) from northern parts of the country. Since then, nine more species have been added to the list of Iraqi spiders, including one described as new to science (Al-Khazali 2020). Recently, we had the opportunity to examine a series of old and freshly collected gnaphosid material from five localities in southern Iraq. In this material, six new species records for the country and the previously unknown female of *Pterotricha kovblyuki* Zamani & Marusik, 2018 were detected, which are reported, illustrated, and in the case of the latter, described herein. In addition, an updated list of gnaphosids currently known from Iraq is presented.

Materials and methods

Specimens were photographed using a Canon EOS 7D camera attached to an Olympus SZX16 stereomicroscope at the Zoological Museum of the University of Turku, or a Sony Alpha 7R II camera attached to an Amscope stereomicroscope at the Department of Ecology of the University of Basrah. Digital images were montaged using CombineZP. Information regarding the distribution ranges are modified after WSC (2022). Geographic coordinates of collection localities, if georeferenced using Google Earth, are given in square brackets. The map was prepared using SimpleMappr (Shorthouse 2010). Lengths of leg segments were measured on the dorsal side and listed as: total length (femur, patella, tibia, metatarsus, tarsus).

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Abbreviations

ALE anterior lateral eye;
AME anterior median eye;
PLE posterior lateral eye;
PME posterior median eye.

Depositories

BNHM Basrah Natural History Museum, University of Basrah, Iraq (Adil Kassim Jasim).
MMBC Moravian Museum Brno Collection, Brno, Czech Republic (Petr Baňař).

Results

Family Gnaphosidae Banks, 1892
Genus *Gnaphosa* Latreille, 1804

***Gnaphosa dolosa* Herman, 1879**

Identification. Ovtsharenko et al. (1992)

Material. IRAQ: ***Thi Qar Province***: 1♀ (BNHM), Al Azraq vil., 31°09'00.0"N, 46°15'59.0"E, agricultural land, 4.3.2022 (G. A. A. Al-Yacoub); ***Basrah Province***: 2♂1♀ (BNHM), Qarmat Ali, 30°33'38.9952"N, 47°45'04.4064"E, agricultural land, 19.6.2021 (S. A. Najim).

Distribution. West Palaearctic.

Comment. In Iraq, *G. dolosa* was previously reported from Al-Qadisiyah Province (Al-Khazali and Hussein 2019).

Genus *Haplodrassus* Chamberlin, 1922

***Haplodrassus dalmatensis* (L. Koch, 1866)**
Fig. 4A

Identification. Bosmans et al. (2018)

Material. IRAQ: ***Najaf Province***: 1♀ (MMBC), Ash Shabakah camp, 150 km SW of Najaf, [30°48'N, 43°39'E], 260 m, stone desert (O. Jakeš).

Distribution. West Palaearctic.

Comment. This is the first record of the genus *Haplodrassus* in Iraq.

Genus *Marinarozelotes* Ponomarev, 2020

***Marinarozelotes jaxartensis* (Kroneberg, 1875)**
Figs 1C, 4C

Identification. Platnick and Song (1986), Levy (1998)

Material. IRAQ: ***Thi Qar Province***: 2♀ (BNHM), Ur district, 31°01'42.5"N, 46°18'07.1"E, agricultural land, 31.3.2022 (G. A. A. Al-Yacoub).

Distribution. North Africa to the Caucasus, Iran, Russia (Europe) to Central Asia. Introduced to Hawaii, USA, Mexico, South Africa, India, China, Japan.

Comment. In Iraq, it was previously reported from Baghdad Province (Baker and Ali 2020).

Genus *Minosiella* Dalmas, 1921

Comments. A small genus, with seven known species known from Greece, North Africa, the Middle East and Central Asia (WSC 2022). This is the first record of this genus in Iraq.

***Minosiella intermedia* Denis, 1958**
Figs 1A, B, 2A, 3D, 4B

Identification. Marusik and Kovblyuk (2009), El-Gendy (2022)

Material. IRAQ: ***Thi Qar Province***: 2♀ (BNHM), Ur district, 31°01'42.5"N, 46°18'07.1"E, agricultural land, 31.3.2022 (G. A. A. Al-Yacoub); ***Basrah Province***: 3♂4♀ (BNHM), Aboskhair (Hour Al-dabbab), 30°42.139'N, 047°25.373'E, wetland, 19.6.2021 (S. A. Najim).

Distribution. Egypt to Afghanistan.

Comment. New record for Iraq. For discussions regarding the possible synonymy of this species with *Minosiella pallida* (L. Koch, 1875) see Marusik and Kovblyuk (2009) and El-Gendy (2022).

Genus *Odontodrassus* Jézéquel, 1965

Comments. A small genus, with eight known species displaying a disjunct distribution: four species have been reported from West and North Africa and the Middle East, while others are known from the Oriental realm, Eastern Palaearctic and a few South Pacific islands (WSC 2022). This is the first record of the genus in Iraq.

***Odontodrassus aravaensis* Levy, 1999**
Figs 1D, 2B, 3A

Identification. Levy (1999).

Material. IRAQ: ***Thi Qar Province***: 2♂ (BNHM), Ur district, 31°01'42.5"N, 46°18'07.1"E, agricultural land, 16.7.2021 (G. A. A. Al-Yacoub).

Distribution. Previously known from Egypt and Israel.

Comment. New record for Iraq, with the current material representing the easternmost record of the species across its known range.

***Odontodrassus mundulus* (O. Pickard-Cambridge, 1872)**
Figs 2C, 3B

Identification. Levy (1999).

Material. IRAQ: ***Najaf Province***: 1♂ (MMBC), Ash Shabakah camp, 150 km SW of Najaf, [30°48'N, 43°39'E], 260 m, stone desert, 15.6.1978 (O. Jakeš).

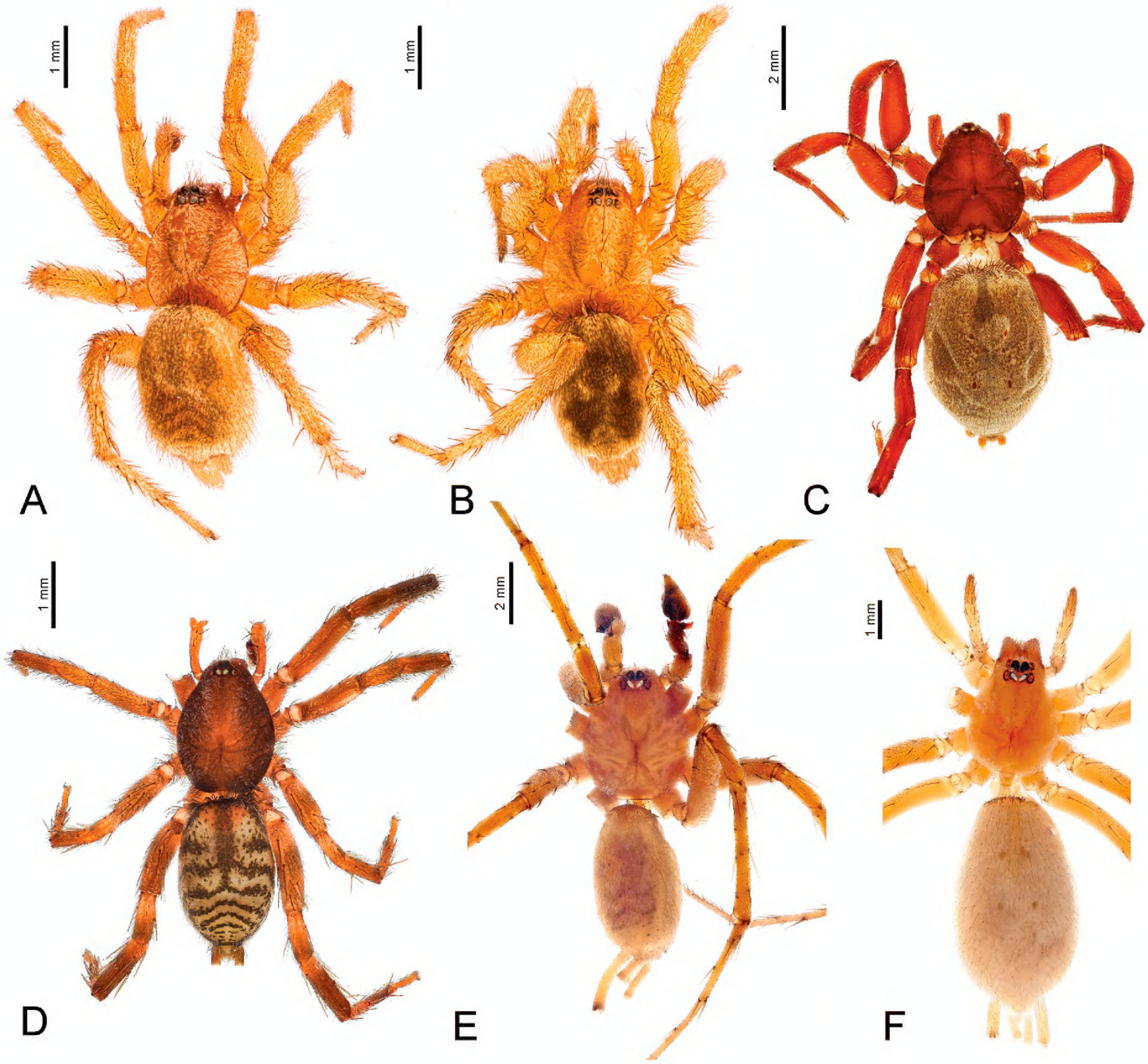

Figure 1. Habitus of male (**A, D, E**) and female (**B, C, F**) gnaphosids, dorsal view. **A, B.** *Minosiella intermedia* Denis, 1958; **C.** *Marinarozelotes jaxartensis* (Kroneberg, 1875); **D.** *Odontodrassus aravaensis* Levy, 1999; **E.** *Pterotricha dalmasi* Fage, 1929; **F.** *Pterotricha kovblyuki* Zamani & Marusik, 2018.

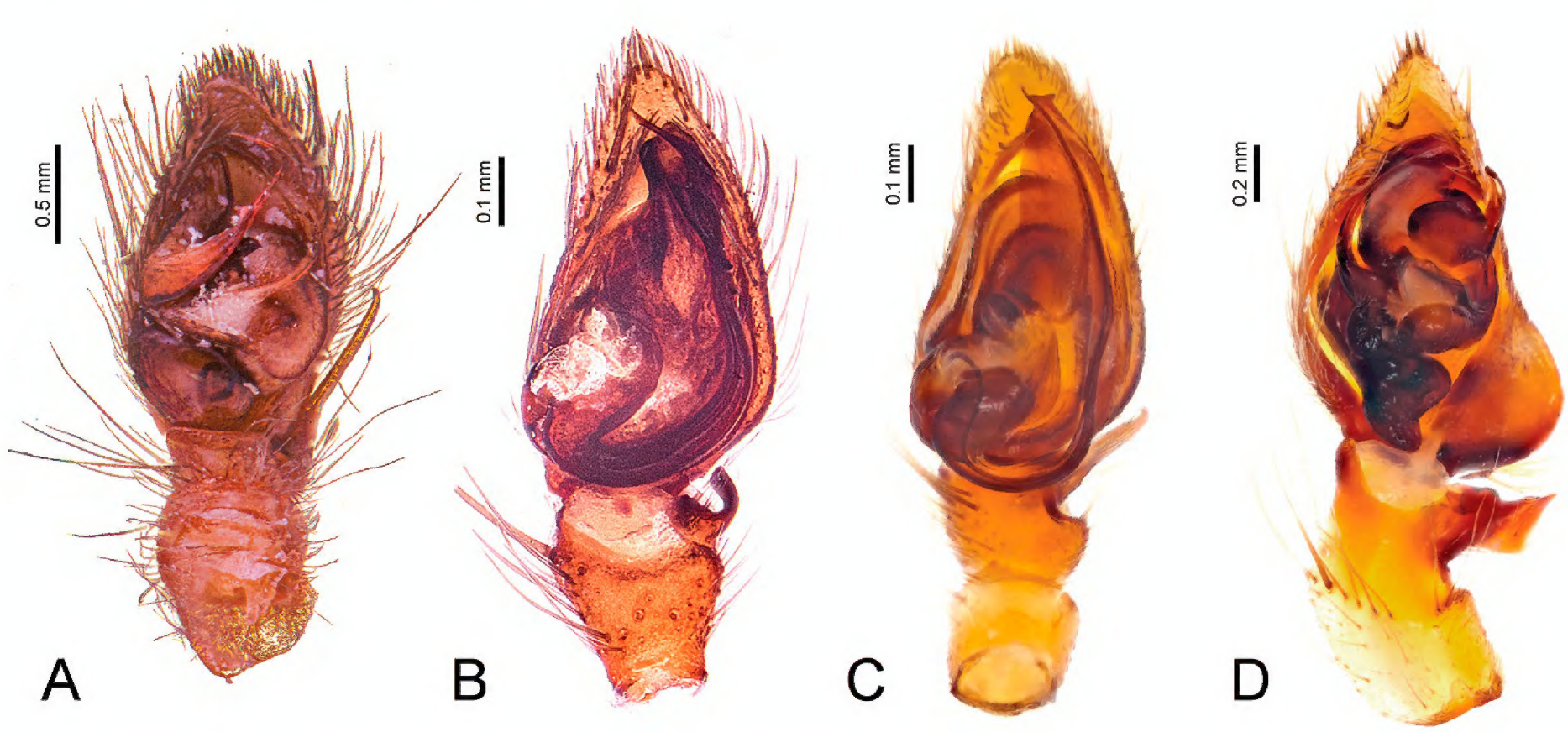

Figure 2. Male palps of gnaphosids, ventral view. **A.** *Minosiella intermedia* Denis, 1958; **B.** *Odontodrassus aravaensis* Levy, 1999; **C.** *Odontodrassus mundulus* (O. Pickard-Cambridge, 1872); **D.** *Pterotricha dalmasi* Fage, 1929.

Distribution. Previously known from North Africa to the Levant.

Comment. New record for Iraq, with the current material representing the easternmost record of the species across its known range.

Genus *Pterotricha* Kulczyński, 1903

Pterotricha dalmasi Fage, 1929

Figs 1E, 2D, 3C, 5A–C

Identification. Zamani (2018).

Material. IRAQ: ***Najaf Province***: 3♂ (MMBC), Ash Shabakah camp, 150 km SW of Najaf, [30°48'N, 43°39'E], 260 m, stone desert (O. Jakeš); 7♂1♀ (MMBC), same locality, 16.10.1972 (O. Jakeš).

Distribution. North Africa and the Middle East.

Comment. New record for Iraq. Previously, this species was only provisionally recorded from Iran based on a single female specimen (Zamani et al. 2018), and specimens of both sexes from United Arab Emirates were only tentatively matched (Zamani 2018); the finding of the two sexes in the same locality reinforces the correct matching of this female with the male of *P. dalmasi*.

The females of this species were described for the first time by Levy (1995), who provided figures of two "forms" of the epigyne (Levy 1995: figs 74–75). In our

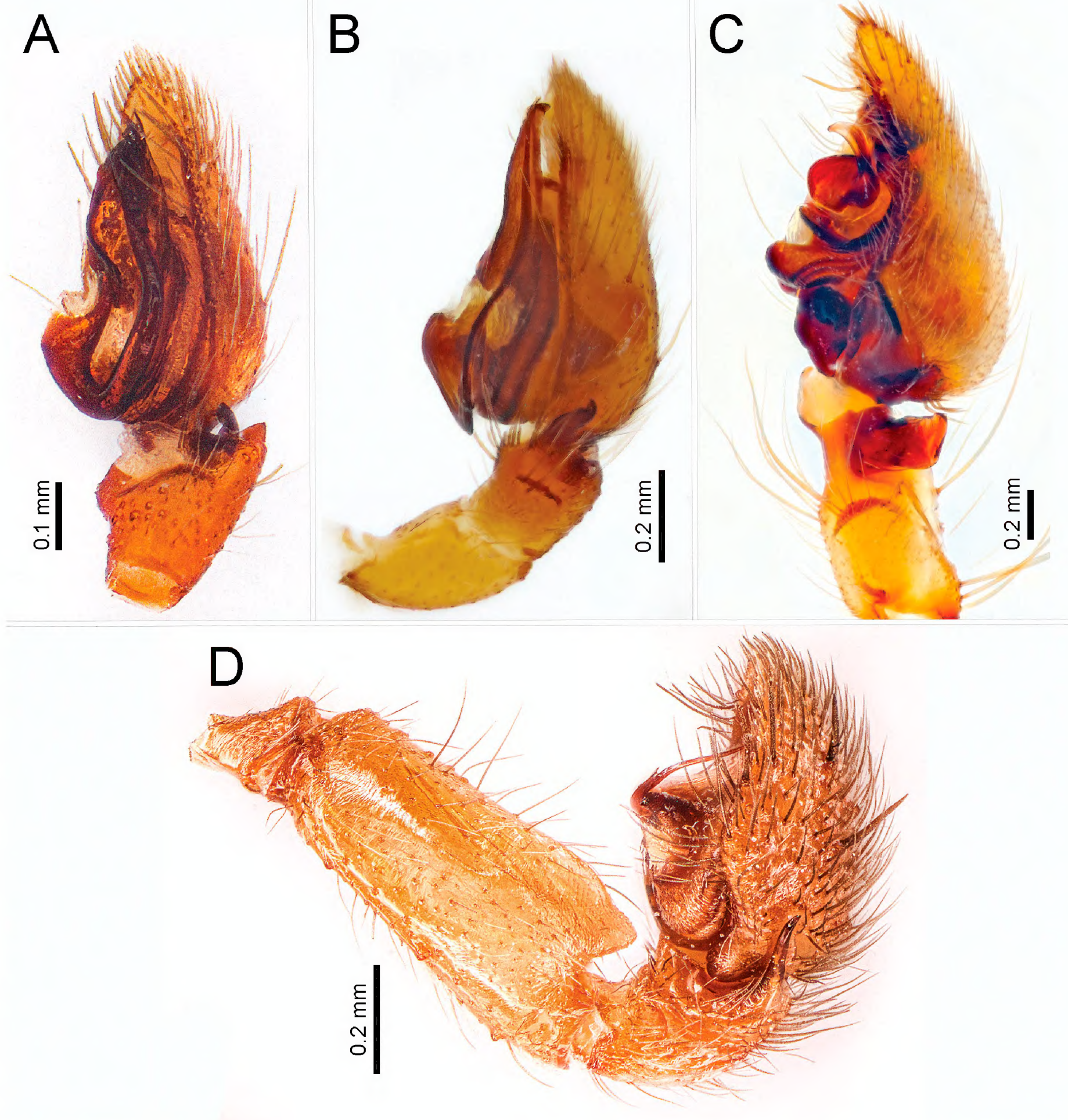

Figure 3. Male palps of gnaphosids, retrolateral view. **A.** *Odontodrassus aravaensis* Levy, 1999; **B.** *Odontodrassus mundulus* (O. Pickard-Cambridge, 1872); **C.** *Pterotricha dalmasi* Fage, 1929; **D.** *Minosiella intermedia* Denis, 1958.

opinion and based on material from Iraq, Iran and UAE, only the form illustrated on fig. 75 is correctly matched with the male of *P. dalmasi*, and the one illustrated on fig. 74 belongs to another (perhaps undescribed) species.

Pterotricha kovblyuki Zamani & Marusik, 2018

Figs 1F, 5D–F

Identification. Zamani et al. (2018), Zamani (2018).

Material. IRAQ: ***Najaf Province***: 14♂1♀ (MMBC), Ash Shabakah camp, 150 km SW of Najaf, [30°48'N, 43°39'E], 260 m, stone desert, 18.1.1979 (O. Jakeš); 19♂2♀ (MMBC), same locality, 11.2.1978 (O. Jakeš); 5♂ (MMBC), same locality, 16.10.1972 (O. Jakeš).

Emended diagnosis. The female of *P. kovblyuki* differs from that of *P. dalmasi* by the round anterior hood (*Ah*) (*vs*. subdivided by a median pointed protrusion; Fig. 5E cf. Fig. 5B). Epigyne of *P. kovblyuki* is most similar to that of *P. algerica* Dalmas, 1921 and *P. egens* Denis, 1966 by having round anterior hood (Fig. 5E cf. Denis 1966: fig. 8 and Dalmas 1921: fig. 29), but can be distinguished from them by diverging lateral margins (*Lm*) of the fovea (*vs*. almost parallel), and anterior hood narrower than posterior part of fovea (*vs*. equal in width). For the male, see Zamani et al. (2018).

Description. Female. Habitus as in Fig. 1F. Total length 8.75. Carapace 2.90 long, 2.30 wide. Eye sizes: AME: 0.21, ALE: 0.21, PLE: 0.20, PME: 0.22. Carapace, chelicerae, sternum, maxillae and labium light brown. Chelicerae with a promarginal tooth and a retromarginal bifurcate serrated keel. Abdomen light beige, with 3 pairs of sigilla and, in some individuals, slightly darker cardiac mark. Spinnerets light yellowish brown, uniform in color. Legs colored as carapace, without annulations. Measurements of legs: I: 9.81 (2.75, 1.19, 2.16, 2.05, 1.66), II: 9.66 (2.56, 1.25, 2.00, 2.12, 1.73), III: 9.78 (2.35, 1.21, 1.88, 2.46, 1.88), IV: 12.53 (3.12, 1.35, 2.66, 3.23, 2.17).

Epigyne as in Fig. 5D–F; plate almost as long as wide; anterior hood with round margin and large lateral diverticula (*Ld*); lateral margin of fovea diverging; posterior part of fovea wider than anterior hood; receptacles (*Re*) and accessorial glands (*Ag*) diverging anteriorly.

Male. See Zamani et al. (2018).

Distribution. Iraq, Iran and United Arab Emirates.

Comment. In Iraq, it was previously reported from Thi Qar Province (Al-Yacoub et al. 2021b). The current material represents the westernmost record of the species across its known range.

Genus *Zelotes* Gistel, 1848

Zelotes fagei Denis, 1955

Fig. 4D, E

Identification. Levy (1998), FitzPatrick (2007).

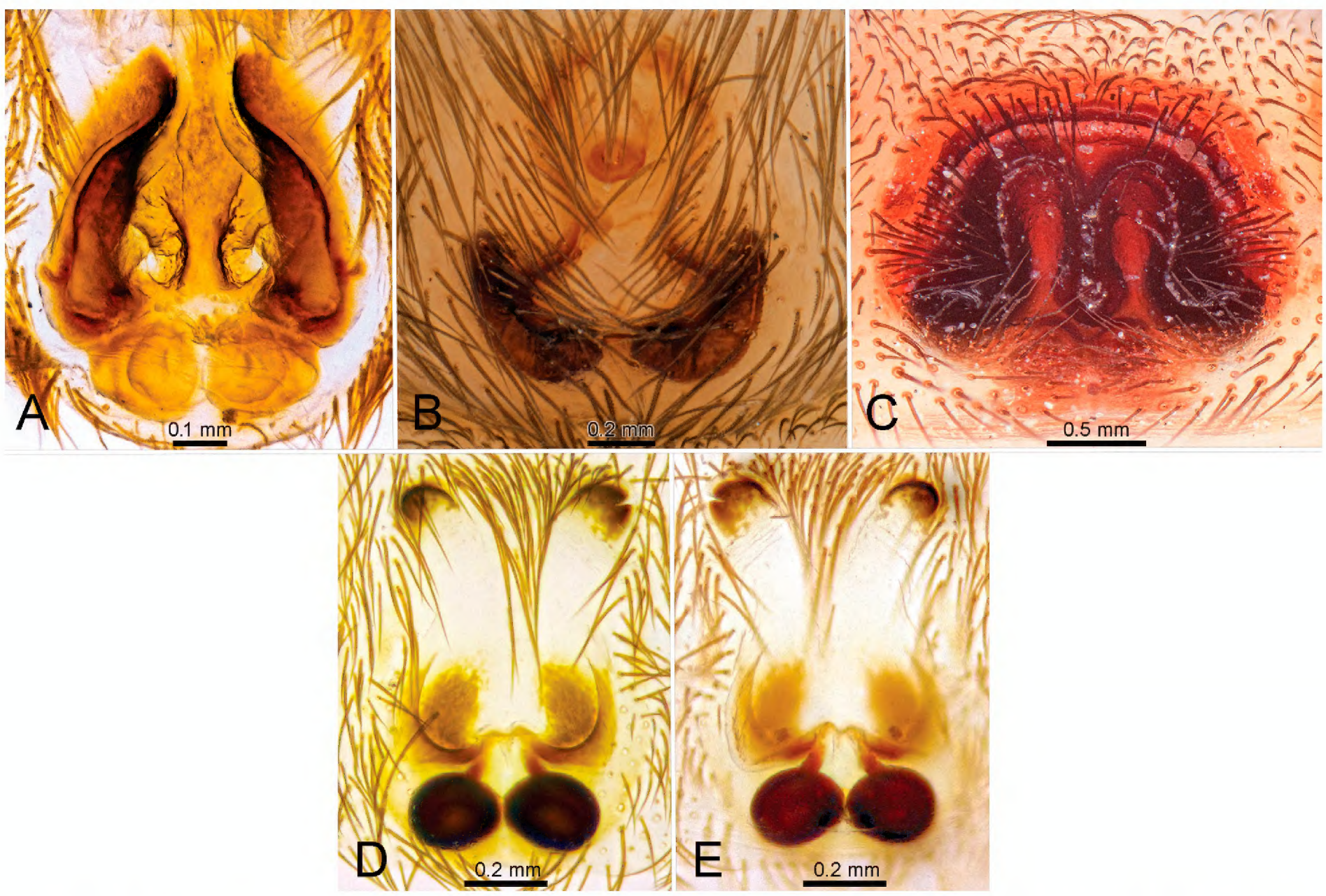

Figure 4. Ventral view of epigynes (**B, C, D**) and dorsal view of vulvae (**A, E**) of gnaphosids. **A.** *Haplodrassus dalmatensis* (L. Koch, 1866); **B.** *Minosiella intermedia* Denis, 1958; **C.** *Marinarozelotes jaxartensis* (Kroneberg, 1875); **D, E.** *Zelotes fagei* Denis, 1955.

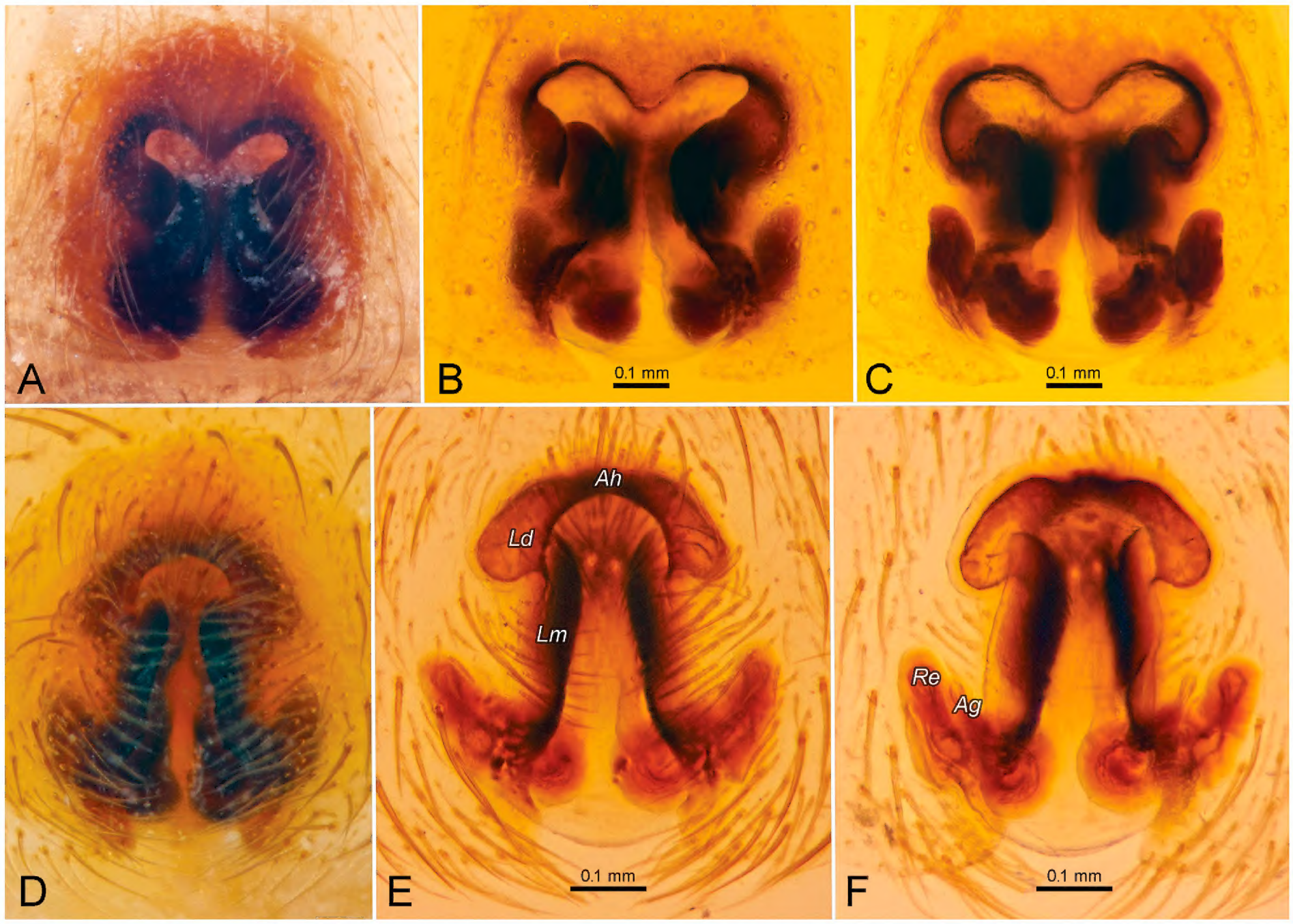

Figure 5. Epigynes of *Pterotricha dalmasi* Fage, 1929 (**A–C**) and *Pterotricha kovblyuki* Zamani & Marusik, 2018 (**D–F**). **A, D.** intact epigyne, ventral view; **B, E.** macerated epigyne, ventral view; **C, F.** vulva, dorsal view. Abbreviations: *Ag* – accessorial gland; *Ah* – anterior hood; *Ld* – lateral duct; *Lm* – lateral margin; *Re* – receptacle.

Material. IRAQ: ***Najaf Province***: 1♀ (MMBC), Ash Shabakah camp, 150 km SW of Najaf, [30°48'N, 43°39'E], 260 m, stone desert, 20.12.1972 (O. Jakeš).

Distribution. Previously known from Niger, Egypt and Israel.

Comment. New record for Iraq, with the current material representing the easternmost record of the species across its known range.

Discussion

As a result of this paper, three genera and six species of Gnaphosidae were reported in Iraq for the first time, and the previously unknown female of *Pterotricha kovblyuki* Zamani & Marusik, 2018 was described. Of the studied material, the records of three species (*Odontodrassus aravaensis*, *Odontodrassus mundulus*, *Zelotes fagei*) represent the easternmost limits in the distribution of the corresponding species, and that of *P. kovblyuki* represents the westernmost limit within its known range.

Currently, there are 16 species of 10 genera of Gnaphosidae known from Iraq, two of them identified only at the genus-level (Table 1). Despite the high diversity of this family in arid and semi-arid regions, the first documented record of Iraqi gnaphosids was provided only very recently (Fomichev et al. 2018). The family is better studied in the neighboring Turkey (159 species) and Iran (134 species), but remains poorly studied in Syria (14 species), Saudi Arabia (10 species) and Jordan (6 species), with no species reported from Kuwait so far (El-Hennawy 2014; Amr 2021; Shakhatreh et al. 2021; Zamani et al. 2021; Danışman et al. 2022; Zamani et al. 2022; WSC 2022). All gnaphosid species reported from Iraq to date are seemingly identified with accuracy; the only exception is the recent record of *Zelotes subterraneus* (C.L. Koch, 1833) (Al-Yacoub and Al-Abbad 2022: figs 4–5 cf. Kovblyuk et al. 2013: figs 15–16), which seems to belong to an undescribed species of the *subterraneus* group.

Almost all species records of Gnaphosidae from Iraq are based on singleton hand-collected specimens, published in scattered papers often recording only one species from the country. As evident from the amount of new data obtained only from five localities in southern Iraq (Fig. 6) and considering the relatively high number of species reported from Iran, Turkey and the considerably smaller Israel (more than 126 species; Zonstein and Marusik 2013), a high diversity of gnaphosids is expected to occur in Iraq as well; this diversity can only be better and more quickly studied once larger and more focused collecting efforts are carried out in different areas of the country, desirably using various collecting methods, especially pitfall traps.

Table 1. List of gnaphosid species currently known from Iraq.

	Species	Records in Iraq	Distribution
1	*Berlandina mesopotamica* Al-Khazali, 2020	Thi Qar (Al-Khazali 2020; Al-Khazali and Fomichev 2021)	Iraq, Iran
2	*Gnaphosa dolosa* Herman, 1879	Al-Qadisiyah, Basrah, Thi Qar (Al-Khazali and Hussein 2019, present study)	West Palaearctic
3	*Haplodrassus dalmatensis* (L. Koch, 1866)	Najaf (present study)	West Palaearctic
4	*Marinarozelotes jaxartensis* (Kroneberg, 1875)	Baghdad, Thi Qar (Baker and Ali 2020, present study)	North Africa to the Caucasus, Iran, Russia (Europe) to Central Asia
5	*Micaria* sp.	Karbala (Baker and Ali 2020)	–
6	*Minosiella intermedia* Denis, 1958	Basrah, Thi Qar (present study)	Egypt to Afghanistan
7	*Nomisia conigera* (Spassky, 1941)	Dohuk (Fomichev et al. 2018)	Middle East to Tajikistan
8	*Odontodrassus aravaensis* Levy, 1999	Thi Qar (present study)	Egypt, Israel, Iraq
9	*Odontodrassus mundulus* (O. Pickard-Cambridge, 1872)	Najaf (present study)	North Africa to the Levant, Iraq
10	*Pterotricha arzhantsevi* Fomichev, Marusik & Koponen, 2018	Dohuk (Fomichev et al. 2018)	Iraq
11	*Pterotricha dalmasi* Fage, 1929	Najaf (present study)	North Africa, the Middle East
12	*Pterotricha esyunini* Zamani, 2018	Thi Qar (Al-Yacoub et al. 2021a)	UAE, Iraq
13	*Pterotricha kovblyuki* Zamani & Marusik, 2018	Thi Qar, Najaf (Al-Yacoub et al. 2021b, present study)	UAE, Iraq, Iran
14	*Zelotes fagei* Denis, 1955	Najaf (present study)	Niger, Egypt, Israel, Iraq
15	*Zelotes subterraneus* (C.L. Koch, 1833)	Thi Qar (Al-Yacoub and Al-Abbad 2022)	West Palaearctic
16	*Zelotes* sp.	Baghdad, Karbala (Baker and Ali 2020)	–

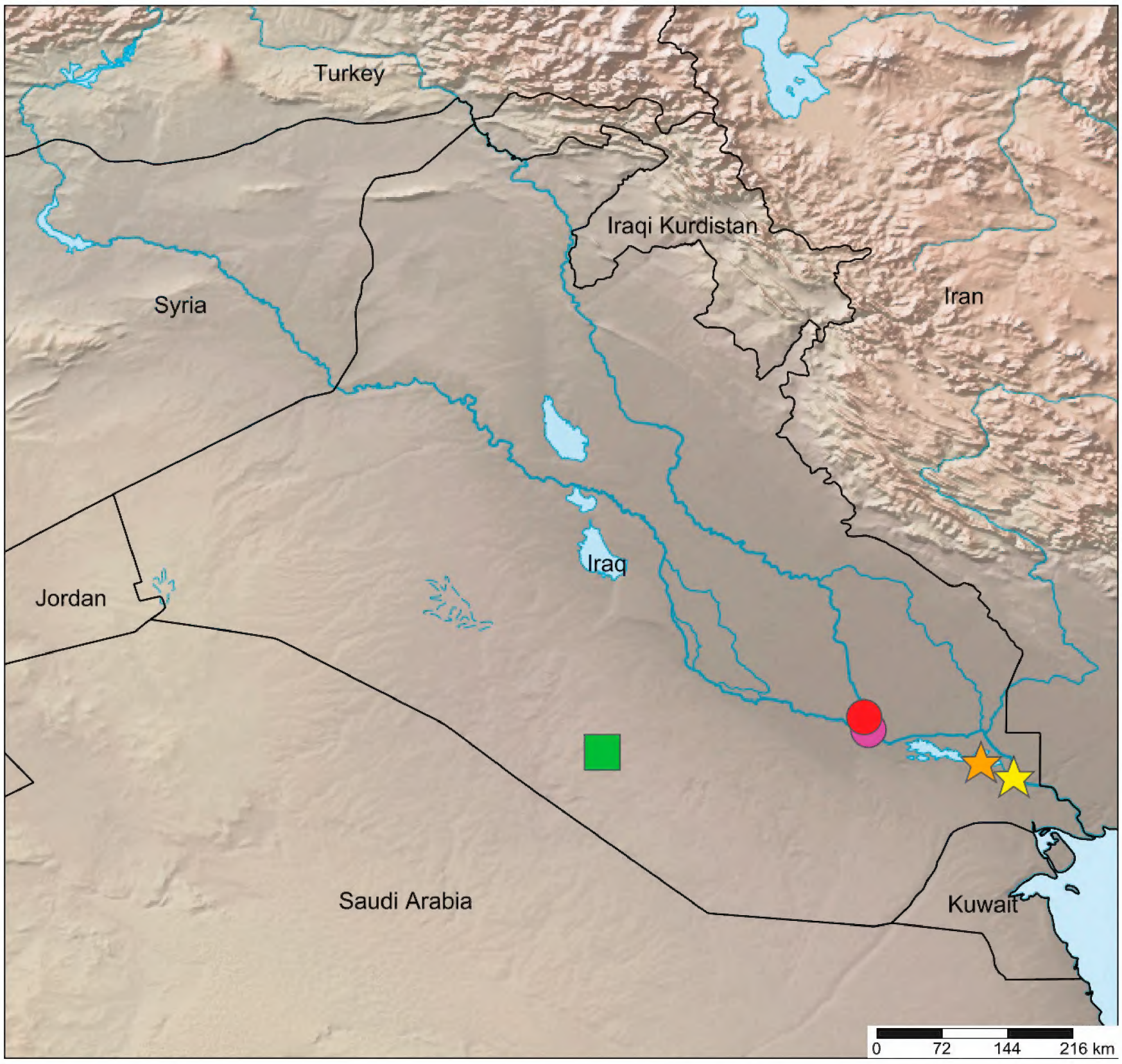

Figure 6. Map of collection localities in Iraq: Basrah, Aboskhair (orange star); Basrah, Qarmat Ali (yellow star); Najaf, Ash Shabakah (green square); Thi Qar, Al Azraq (red circle); Thi Qar, Ur (purple circle).

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References

Al-Khazali AM (2020) *Berlandina mesopotamica* sp. nov. (Araneae: Gnaphosidae): new record of the genus in Iraq. Arachnology 18(5): 444–446. https://doi.org/10.13156/arac.2020.18.5.444

Al-Khazali AM, Fomichev AA (2021) Description of the female of *Berlandina mesopotamica* (Araneae: Gnaphosidae). Arachnologische Mitteilungen 61: 70–72. https://doi.org/10.30963/aramit6111

Al-Khazali AM, Hussein AN (2019) First record of genus *Gnaphosa* Latreille, 1804 (Araneae: Gnaphosidae) in Iraq. Serket 16(4): 161–165.

Al-Yacoub GAA, Al-Abbad MYM (2022) Genus *Zelotes* Gistel, 1848 (Araneae: Gnaphosidae), a new record from Iraq. Serket 18(3): 386–390.

Al-Yacoub GAA, Al-Abbad MYM, Kareem DK (2021a) *Pterotricha esyunini* Zamani, 2018 (Araneae: Gnaphosidae), a new record for Iraqi spiders. Serket 18(1): 31–35.

Al-Yacoub GAA, Al-Abbad MYM, Kareem DK (2021b) First record of *Pterotricha kovblyuki* Zamani & Marusik, 2018 (Araneae: Gnaphosidae) from Iraq. Serket 18(2): 186–190.

Amr ZS (2021) The state of biodiversity in Kuwait. Gland, Switzerland: IUCN; the State of Kuwait, Kuwait: Environmental Public Authority. https://doi.org/10.2305/IUCN.CH.2021.11.en

Baker IM, Ali HB (2020) Taxonomical study of spiders (Order, Araneae) from different localities of Iraq. Iraq Natural History Museum Publication 38: 1–51. https://doi.org/10.26842/inhmp.7.2020.2.38.0051

Bosmans R, Kherbouche-Abrous O, Benhalima S, Hervé C (2018) The genus *Haplodrassus* Chamberlin, 1922 in the Mediterranean and the Maghreb in particular (Araneae: Gnaphosidae). Zootaxa 4451(1): 1–67. https://doi.org/10.11646/zootaxa.4451.1.1

Dalmas R de (1921) Monographie des araignées de la section des *Pterotricha* (Aran. Gnaphosidae). Annales de la Société Entomologique de France 89: 233–328.

Danışman T, Kunt KB, Özkütük RS (2022) The Checklist of the Spiders of Turkey. Version 2022. [Online at] http://www.spidersofturkey.info [accessed on 30.5.2022]

Denis J (1966) Les araignées du Fezzân. Bulletin de la Société d'Histoire Naturelle d'Afrique du Nord 55: 103–144.

El-Gendy AA (2022) First record of *Minosiella intermedia* (Araneae: Gnaphosidae) from Egypt. Arachnologische Mitteilungen 63: 4–6. https://doi.org/10.30963/aramit6302

El-Hennawy HK (2014) Preliminary list of spiders and other arachnids of Saudi Arabia (except ticks and mites). Serket 14(1): 22–58.

FitzPatrick MJ (2007) A taxonomic revision of the Afrotropical species of *Zelotes* (Arachnida: Araneae: Gnaphosidae). Bulletin of the British Arachnological Society 14(3): 97–172. https://doi.org/10.13156/arac.2011.14.3.97

Fomichev AA, Marusik YM, Koponen S (2018) New data on spiders (Arachnida: Araneae) of Iraq. Zoology in the Middle East 64(4): 329–339. https://doi.org/10.1080/09397140.2018.1484018

Jocqué R, Dippenaar-Schoeman AS (2006) Spider families of the world. Musée Royal de l'Afrique Central Tervuren, 336 pp.

Kovblyuk MM, Marusik YM, Omelko MM (2013) On four poorly known species of spiders (Araneae: Gnaphosidae and Lycosidae) described by T. Thorell from Crimea. Acta Zoologica Bulgarica 65(4): 423–427.

Levy G (1998) The ground-spider genera *Setaphis*, *Trachyzelotes*, *Zelotes*, and *Drassyllus* (Araneae: Gnaphosidae) in Israel. Israel Journal of Zoology 44: 93–158.

Levy G (1999) Spiders of six uncommon drassodine genera (Araneae: Gnaphosidae) from Israel. Israel Journal of Zoology 45: 427–452.

Marusik YM, Kovblyuk MM (2009) Redescription of *Minosiella intermedia* Denis, 1958 (Araneae: Gnaphosidae) with first description of the male. Zootaxa 2291: 65–68. https://doi.org/10.11646/zootaxa.2291.1.5

Ovtsharenko VI, Platnick NI, Song DX (1992) A review of the North Asian ground spiders of the genus *Gnaphosa* (Araneae, Gnaphosidae). Bulletin of the American Museum of Natural History 212: 1–88.

Platnick NI, Song DX (1986) A review of the zelotine spiders (Araneae, Gnaphosidae) of China. American Museum Novitates 2848: 1–22.

Ponomarev AV, Shmatko VY (2020) A review of spiders of the genera *Trachyzeloes* [sic] Lohmander, 1944 and *Marinarozelotes* Ponomarev, gen. n. (Aranei: Gnaphosidae) from the southeast of the Russian Plain and the Caucasus. Caucasian Entomological Bulletin 16(1): 125–139. https://doi.org/10.23885/181433262020161-125139

Shakhatreh MR, Amr ZS, Abu Baker MR (2021) Spiders of Jordan: a preliminary Study. Turkish Journal of Bioscience and Collections 5(1): 1–11. https://doi.org/10.26650/tjbc.2021822162

Shorthouse DP (2010) SimpleMappr, an online tool to produce publication-quality point maps. http://www.simplemappr.net [accessed on 30.5.2022]

WSC (2022) World Spider Catalog. Version 23.0. Natural History Museum Bern. http://wsc.nmbe.ch [accessed on 30.5.2022]

Zamani A (2018) The spider genus *Pterotricha* Kulczyński, 1903 (Araneae, Gnaphosidae) in the United Arab Emirates. Evolutionary Systematics 2: 151–161. https://doi.org/10.3897/evolsyst.2.2998

Zamani A, Chatzaki M, Esyunin SL, Marusik YM (2021) One new genus and nineteen new species of ground spiders (Araneae: Gnaphosidae) from Iran, with other taxonomic considerations. European Journal of Taxonomy 751: 68–114. https://doi.org/10.5852/ejt.2021.751.1381

Zamani A, Mirshamsi O, Marusik YM, Moradmand M. (2022). The Checklist of the Spiders of Iran. Version 2022. http://www.spiders.ir [accessed on 30.5.2022]

Zamani A, Seiedy M, Saboori A, Marusik YM (2018) The spider genus *Pterotricha* in Iran, with the description of a new genus (Araneae, Gnaphosidae). ZooKeys 777: 17–41. https://doi.org/10.3897/zookeys.777.26745

Zonstein S, Marusik YM (2013) Checklist of the spiders (Araneae) of Israel. Zootaxa 3671(1): 1–127. https://doi.org/10.11646/zootaxa.3671.1.1